

<110> Organization Name : Carlsberg A/S

Application Project

<120> Title : Barley for production of flavor-stable beer

<130> AppFileReference : 1

<140> CurrentAppNumber :

<141> CurrentFilingDate : ____-__-__

Sequence

<213> OrganismName : Hordeum vulgare cv. Barke

<400> PreSequenceString :

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<212> Type : DNA

<211> Length : 4165

SequenceName : SEQ ID NO: 1

SequenceDescription : Barley genomic sequence of cv. Barke,
spanning
the start and stop codons of the gene encoding LOX-1

Sequence

<213> OrganismName : Hordeum vulgare mutant D112

<400> PreSequenceString :

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<212> Type : DNA

<211> Length : 4165

SequenceName : SEQ ID NO: 2

SequenceDescription : Barley genomic sequence of mutant D112 spanning the segment, corresponding to the region between the start and stop codons of the gene encoding LOX-1 of cv. Barke

Sequence

<213> OrganismName : Hordeum vulgare cv. Barke

<400> PreSequenceString :

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EFLKKTITLH DVPGRSGNLT FVANSWIYPA ANYRYSRVFF ANDTYLPSQM PAALKPYRDD 180
ELRNLRGDDQ QGPYQEHDR IYRYDVYNDLG EGRPILGGNS DHPYPRRGRT ERKPNASDPS 240
LESRLSLLEQ IYVPRDEKFG HLKTSDFLGY SIKAITQGIL PAVRTYVDTT PGEFDSFQDI 300
INLYEGGIKL PKVAALEELR KQFPLQLIKD LLPVGDSLL KLPVPHIIQE NKQAWRTDEE 360
FAREVLAVGN PVMITRLTEF PPKSSLDPK FGDHTSTITA EHIEKNLEGL TVQQALESNR 420
LYILDHHRDF MPFLIDVNNL PGNFYIYATR LFFLRGDGRL TPLAIELSEP IIQGGLTTAK 480
SKVYTPVPSG SVEGWVWELA KAYVAVND SG WHQLVSHWLN THAVMEPFVI STNRHLSVTH 540
PVHKL LSPHY RDTMTINALA RQTLINAGGI FEMTVFPGKF ALGMSAVVYK DWKFTEQGLP 600
DDLIKRGMAV EDPSSPYKVR LLVSDYPYAA DGLAIWHAIE QYVSEYLA IY YPNDGVLQGD 660
TEVQAWWKET REVGHGDLKD APWWPKMQSV PELAKACTTI IWIGSALHAA VNFGQYPYAG 720
FLPNRPTVSR RRMPEPGTEE YAELE RDPER AFIHTITSQI QTIIGVSLLE VLSKHSSDEL 780
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<212> Type : PRT

<211> Length : 862

SequenceName : SEQ ID NO: 3

SequenceDescription : Protein sequence of full-length LOX-1 protein of cv. Barke

Sequence

<213> OrganismName : Hordeum vulgare mutant D112

<400> PreSequenceString :

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LESRLSLLEQ	IYVPRDEKFG	HLKTSDFLGY	SIKAITQGIL	PAVRTYVDTT	PGEFDSFQDI	300
INLYEGGIKL	PKVAALIELR	KQFPLQLIKD	LLPVGGDSL	LKLPVPHIIQ	EKQAWRTDEE	360
FAREVLAVGN	PVMITRLTEF	PPKSSLDPSK	FGDHTSTITA	EHIEKNLEGL	TVQQALESNR	420
LYILDHHRDF	MPFLIDVNNL	PGNFIYATRT	LFFLRGDGRL	TPLAIELSEP	IIQGGLTTAK	480
SKVYTPVPSG	SVEGWVWELA	KAYVAVND	SGWHQLVSHW	LNTHAVMEPF	VI	540
STNRHLSVTH						
PVHKLLSPHY	RDTMTINALA	RQTLINAGGI	FEMTVFPGKF	ALGMSAVVYK	DWKFTQQGLP	600
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<212> Type : PRT

<211> Length : 665

SequenceName : SEQ ID NO: 4

SequenceDescription : Protein sequence of inactive,
truncated LOX-1 of mutant D112

Sequence

<213> OrganismName : Hordeum vulgare cv. Neruda

<400> PreSequenceString :

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cgccacc	atc	atcgac	ggca	tcggcg	agtt	cctcgg	caag	ggcg	tcac	180
ctt	gccag	cttat	cag	ctcc	acc	gccgt	cgacc	aag	gta	240
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catccccaac agcatctcca tctaa 4165

```

<212> Type : DNA

<211> Length : 4165

SequenceName : SEQ ID NO: 5

SequenceDescription : Barley genomic sequence of cv. Neruda spanning the start and stop codons of the gene encoding LOX-1

Sequence

<213> OrganismName : Hordeum vulgare mutant A618

<400> PreSequenceString :

```

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acggcacgtc aaaagcaaca caaacctaaa ctaaagcaca aagacgtaag agcaagcaca 540
caatcagcag gctataaaca gttgtcatca aaaacaacgc tggaagagag agagaaggaa 600

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catccccaac agcatctcca tctaa                                         4165

```

<212> Type : DNA

<211> Length : 4165

SequenceName : SEQ ID NO: 6

SequenceDescription : Barley genomic sequence of mutant A618, spanning the segment corresponding to the region between the start and stop codons of the gene encoding LOX-1 of cv. Neruda

Sequence

<213> OrganismName : Hordeum vulgare cv. Neruda

<400> PreSequenceString :

```

MLLGGLIDTL TGANKSARLK GTVVLMRKNV LDLNDFGATI IDGIGEFLEK GVTCLISST      60
AVDQDNNGRG KVGAEAELEQ WVTSLPSLTG GESKFGLTFD WEVEKLGVPK AIVNNYHSS      120
EFLKTLITLH DVPGRSGNLT FVANSWIYPA ANYRYSRVFF ANDTYLPSQM PAALKPYRDD      180
ELRNLRGDDQ QGPYQEHDRY YRYDVYNDLG EGRPIGGSNS DHPYPRRGRT ERKPNASDPS      240
LESRLSLLEQ IYVPRDEKFG HLKTSDFLGY SIKAITQGIL PAVRTYVDTT PGFDSFQDI      300
INLYEGGIKL PKVAALAEELR KQFPLQLIKD LLPVGGDSLL KLPVPPIIQE NKQAWRTDEE      360
FAREVLGVN PVMITRLTEF PPKSSLDPSK FGDHTSTITA EHIEKNLEGL TVQQALESNR      420

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LYILDHHDRF MPFLIDVNNL PGNFIYATRT LFFLRGDGRL TPLAIELSEP IIQGGLTTAK	480
SKVYTPVPSG SVEGWVWELA KAYVAVNDSG WHQLVSHWLN THAVMEPFVI STNRHLSVTH	540
PVHKLLSPHY RDTMTINALA RQTLINAGGI FEMTVFPGKF ALGMSAVVYK DWKFTEQGLP	600
DDLIKRGMAV EDPSSPYKVR LLVSDYPYAA DGLAIWHAIE QYVSEYLAIY YPNDGVLQGD	660
TEVQAWWKET REVGHGDLKD APWWPKMQSV PELAKACTTI IWIGSALHAA VNFGQYPYAG	720
FLPNRPTVSR RRMPEPGTEE YAELEDPER AFIHTITSQI QTIIGVSLLE VLSKHSSDEL	780
YLGQRDTPEW TSDPKALEVF KRFSDDLVEI ESKVVGMMND PELKNRNGPA KFPYMLLYPN	840
TSDHKGAAAG LTAKGIPNSI SI	862

<212> Type : PRT

<211> Length : 862

SequenceName : SEQ ID NO: 7

SequenceDescription : Protein sequence of full-length

LOX-1 protein of cv. Neruda

Sequence

<213> OrganismName : Hordeum vulgare mutant A618

<400> PreSequenceString :

MLLGGLIDTL TGANKSARLK GTVVLMRKNV LDLNDFGATI IDGIGEFLGK GVTCQLISST	60
AVDQDNNGRG KVGAEAELEQ WVTSLPSLTT GESKFGLTFD WEVEKLGVPK AIVVNNYHSS	120
BFLKKTITLH DVPGRSGNLT FVANSWIYPA ANYRYSRVFF ANDTYLPSQM PAALKPYRDD	180
ELRNLRGDDQ QGPYQEHDRY YRYDVYNDLG EGRPILGGNS DHPYPRRGRT ERKPNASDPS	240
LESRLSLLEQ IYVPRDEKFG HLKTSDFLGY SIKAITQGIL PAVRTYVDTT PGEFDSFQDI	300
INLYEGGIKL PKVAALEELR KQFPLQLIKD LLPVGGDSLK KLPVPPIIQE NKQAWRTDEE	360
FAREVLGVN PVMITRLTMS QRLFVHCVCV VSMVRKCRS	399

<212> Type : PRT

<211> Length : 399

SequenceName : SEQ ID NO: 8

SequenceDescription : Protein sequence of inactive,
truncated LOX-1 of mutant A618

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :

gaaagcgagg agaggaggcc aagaacaa

28

<212> Type : DNA

<211> Length : 28

SequenceName : SEQ ID NO: 9

SequenceDescription : Oligonucleotide primer used for PCR
amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :

ttattcatcc atggttgccg atggcttaga

30

<212> Type : DNA

<211> Length : 30

SequenceName : SEQ ID NO: 10

SequenceDescription : Oligonucleotide primer used for PCR
amplification (antisense primer)

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :

agggactgcc ggacgatctc a

21

<212> Type : DNA

<211> Length : 21

SequenceName : SEQ ID NO: 11

SequenceDescription : Oligonucleotide primer used for PCR
amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :

gccagctccg gcacactt

18

<212> Type : DNA

<211> Length : 18

SequenceName : SEQ ID NO: 12

SequenceDescription : Oligonucleotide primer used for PCR
amplification (antisense primer)

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :
caaggtgcgg ttgctggtgt c 21
<212> Type : DNA
<211> Length : 21
SequenceName : SEQ ID NO: 13
SequenceDescription : Oligonucleotide primer used for PCR
amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
ctcgcgctc tccttccac 19
<212> Type : DNA
<211> Length : 19
SequenceName : SEQ ID NO: 14
SequenceDescription : Oligonucleotide primer used for PCR
amplification (antisense primer) Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
ctcgcgctc tccttccat 19
<212> Type : DNA
<211> Length : 19
SequenceName : SEQ ID NO: 15
SequenceDescription : Oligonucleotide primer used for PCR
amplification (antisense primer)

Sequence

<213> OrganismName : Oligonucleotide
<400> PreSequenceString :
tacgtgccgc gggacgagaa g 21
<212> Type : DNA
<211> Length : 21
SequenceName : SEQ ID NO: 16
SequenceDescription : Oligonucleotide primer used for PCR
amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :

tgatcatgac cgggttgacg t

21

<212> Type : DNA

<211> Length : 21

SequenceName : SEQ ID NO: 17

SequenceDescription : Oligonucleotide primer used for PCR
amplification (antisense primer)

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :

catatgctgc tgggagggt g

21

<212> Type : DNA

<211> Length : 21

SequenceName : SEQ ID NO: 18

SequenceDescription : Oligonucleotide primer used for PCR
amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :

gaattcttag atggagatgc tggtggg

27

<212> Type : DNA

<211> Length : 27

SequenceName : SEQ ID NO: 19

SequenceDescription : Oligonucleotide primer used for PCR
amplification (antisense primer)

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :

ctacccgtac gcggcggacg ggct

24

<212> Type : DNA

<211> Length : 24

SequenceName : SEQ ID NO: 20

SequenceDescription : Oligonucleotide primer used for PCR
amplification (sense primer)

Sequence

<213> OrganismName : Oligonucleotide

<400> PreSequenceString :

tcctgaattc acgcctgcac ctccgtatcg c

31

<212> Type : DNA

<211> Length : 31

SequenceName : SEQ ID NO: 21

SequenceDescription : Oligonucleotide primer used for PCR
amplification (antisense primer)